



## **MAGIC VALLEY HATCHERY**

### **2001 Brood Year Report**

**By:**

**Rick Lowell, Fish Hatchery Manager II  
Dave May, Assistant Fish Hatchery Manager  
Wade Symons, Fish Culturist  
Jeff Heindel, Fish Culturist**

**March 2003  
IDFG 03-01**

## TABLE OF CONTENTS

	<b><u>Page</u></b>
ABSTRACT .....	1
INTRODUCTION .....	2
OBJECTIVES .....	2
FACILITIES .....	2
WATER SUPPLY .....	3
STAFFING .....	3
FISH PRODUCTION.....	3
Egg Shipments and Early Rearing .....	3
Final Production Rearing.....	4
Length Frequency Data.....	4
FISH HEALTH.....	4
Diseases Encountered and Treatment.....	4
Acute Losses.....	5
Other Assessments .....	5
Precocial Male Observation .....	5
FISH MARKING .....	5
PHOSPHORUS CHARACTERIZATION STUDY .....	6
MAINTENANCE PROJECTS.....	6
LITERATURE CITED .....	7
APPENDICES .....	8

## LIST OF APPENDICES

Appendix A. Brood Year 2001 Steelhead Survival Rate .....	9
Appendix B. Brood Year 2001 Production Feed Cost and Utilization .....	9
Appendix C. Brood Year 2001 Steelhead Smolt Distribution in the Salmon River and Tributaries .....	10
Appendix D. Brood Year 2001 Final Raceway Inventory with Flow and Density Indices...	11

## TABLE OF CONTENTS continued

	<b><u>Page</u></b>
Appendix E. Brood Year 2001 Organosomatic Index Expressed in Percent of Normals....	12
Appendix F. Brood Year 2001 Coded-Wire and PIT Tag Releases.....	12
Appendix G. Historical Release Data.....	13
Appendix H. Brood Year 2001 Length Frequency Graph .....	14
Appendix I. Hayspur Rainbow and Kamloop Trout started for Hagerman State Hatchery	15
Appendix J. Hatchery Water Flows 1995–2002.....	16
Appendix K. Brood Year 2001 Precocial Male Sampling Results .....	17
Appendix L. Thirteen Year Average of Stock Survival .....	18
Appendix M. Phosphorus Characterization Study .....	19

## ABSTRACT

The fifteenth year (May 1, 2001 to May 10, 2002) of steelhead *Oncorhynchus mykiss* production at Magic Valley Steelhead Hatchery was completed with a total of 1,899,530 smolts planted. All smolts placed in the Squaw Creek Acclimation Pond out-migrated in 2002. Therefore, all A-run and B-run steelhead smolts were stocked where they could migrate to the ocean. Smolt production yielded a total weight of 461,460 lbs. Fish were fed 519,982 lbs of feed for a conversion of 1.13 (lbs of feed per lb of gain).

Five different stocks of steelhead were received as eyed-eggs during May and June of 2001. The Dworshak B-run eggs totaled 1,131,772 and contributed 646,739 smolts to the river. The B-run East Fork Salmon River eggs totaled 81,622 including 3,800 East Fork Natural B eggs. All 63,156 of the East Fork fish were planted as smolts. Of these, 3,800 were East Fork Natural B strain fish. Sawtooth A-run eggs totaled 399,000, which produced 328,811 smolts. Pahsimeroi Fish Hatchery contributed 906,282 A-run steelhead eggs, and 860,824 as smolts. Further stocking information is located in Appendix A.

For the fifth consecutive year, Hayspur strain rainbow and kamloop trout eggs were started here to help Hagerman State Hatchery with their shortage of incubation space during the winter. Appendix I summarizes Hayspur egg to fry survival.

An effluent characterization study was reinitiated during calendar year 2001. Results confirmed maximum phosphorus output coincided with maximum fish production. Maximum phosphorus concentrations fell within permitted limits.

Authors:

Rick Lowell  
Fish Hatchery Manager II

Dave May  
Fish Hatchery Assistant Manager

Wade Symons  
Fish Culturist

Jeff Heindel  
Fish Culturist

## INTRODUCTION

The Magic Valley Steelhead Hatchery (MVH) is part of the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP), compensating for losses of steelhead, *Oncorhynchus mykiss* caused by the Lower Snake River dams. The hatchery was constructed by the US Army Corps of Engineers (USACE), is administered and funded by the US Fish and Wildlife Service (USFWS), and is operated by the Idaho Department of Fish and Game (Department).

The hatchery is located in Twin Falls County, seven miles northwest of Filer in the Snake River Canyon. When available, the hatchery can use a maximum 125 cubic foot per second (cfs) of 59°F water from Crystal Springs, located on the North shore of the Snake River.

All smolts were transported by truck to the Salmon River and associated tributaries. The brood sources were Dworshak Fish Hatchery (Dworshak) B-run stock, East Fork Salmon River B-run stock, Sawtooth Fish Hatchery (Sawtooth) A-run, and Pahsimeroi Fish Hatchery (Pahsimeroi) A-run stock.

## OBJECTIVES

1. Hatch and rear 2.0 million A-run and B-run steelhead smolts for stocking in the Salmon River and its tributaries to achieve the mitigation goal of 11,660 adult steelhead back to Idaho waters.
2. Provide smolts and, consequently, returning adults that could be utilized for harvest, broodstock, supplementation, reintroduction, and research purposes.
3. Mark hatchery smolts prior to release to avoid mixed stock harvest and to maximize harvest and natural production management options.

## FACILITIES

The hatchery building houses the incubation and early rearing room with 40 upwelling 12 gallon capacity incubators. Each incubator is capable of handling and hatching 50,000- to 75,000 eyed-eggs. Two incubators are placed over each raceway. There are 20 concrete tanks measuring 4-ft x 3-ft x 40-ft, which provide 418 cubic ft of rearing space with a capacity of rearing 115,000 to 125,000 steelhead to 200 fish per pound (fpp) size. The early rearing room also houses two fiberglass troughs (2-ft x 1-ft x 12-ft), and 60 automatic fry feeders. The hatchery building also contains an office, laboratory, wet laboratory, shop, dormitory, enclosed storage room, covered vehicle storage area, feed storage room, walk-in freezer, and mechanical room for water pumps, water chiller, and domestic water supply systems.

There are 32 outside rearing raceways (10-ft x 3-ft x 200-ft, with 6,153 cu ft of rearing space). These raceways slope in opposite directions resulting in 16 East raceways and 16 West raceways. Each raceway has the capacity to raise 60,000 to 70,000 smolt-size steelhead. The raceways may be further divided to result in a total of 64 individual rearing subunits. A moveable bridge equipped with 16 automatic Nielsen fish feeders spans the outdoor raceways. Two 30,000-

pound bulk feed bins, equipped with fish feed fines shakers and a feed conveyor, complete the outside feeding system.

There are two outside tailraces located on opposite ends of the facility. Each flows to the north where they join in a common 54-inch pipe before entering the flow-through settling pond. The hatchery effluent water is treated by opening valves in the bottom of quiescent zones and sweeping wastes into a cleaning wastewater pond (approximately 2.5 surface acres). A hatchery flow-through wastewater pond (about 1.5 surface acres in size) settles the non-cleaning wastewater. All cleaning effluent must pass through both ponds prior to discharge.

The limiting factors in producing more smolts at MVH are rearing space and water flows. Density and flow indices may exceed the maximum recommended levels of .30 lbs of fish per cubic foot of rearing space per inch of fish length, and 1.25 lbs per gallon per minute (gpm) per inch of fish length at the end of the rearing cycle. Water flows continue to decrease in recent years. Appendix J shows flows over the last eight years during early-April representing flow at or near projected maximum loading. Currently, high flows are in the 90 to 95 cfs range.

## **WATER SUPPLY**

The MVH water supply collection facility is located on the north wall of the Snake River canyon. It collects the 59°F spring water from Crystal Springs in a covered concrete channel system, which consolidates the flow in a metal building. A 42-inch pipeline has the capacity to deliver 125.47 cfs of water via gravity flow to a control tank that degasses and distributes the water to the outside raceways through a 42-inch pipeline. Water may be diverted from the headrace supply line for use in the auxiliary supply waterlines. The auxiliary supply line allows supplemental water usage between raceway sections to improve water quality in the lower sections and to clean upper quiescent zones without dewatering the bottom section. The hatchery building receives water through a 14-inch pipeline, which branches off prior to going through the outside degassing tower. Water going to the hatchery building is degassed in packed columns above each individual raceway.

## **STAFFING**

During the 2001 brood year, MVH was staffed with the following permanent employees: Rick Lowell, Fish Hatchery Manager II; Dave May, Assistant Hatchery Manager; Wade Symons and Jeff Heindel Fish Culturists. In addition, temporary bio-aides or laborers are sometimes hired to assist with fish culture duties during peak production, smolt transportation, and adipose fin clipping. Our bio-aide at the beginning of this brood year was Brad Wahlen. He left in December of 2001 and was replaced by Chris James in January 2002. Chris left in March and was replaced by Pat Traxler in May 2002. Personnel from this hatchery continue to oversee adipose marking operations at the Niagara Springs, Hagerman National, and Magic Valley hatcheries.

## **FISH PRODUCTION**

### **Egg Shipments and Early Rearing**

The hatchery received 1,131,772 B-run (Dworshak) eyed-eggs and 81,622 B-run eyed-eggs (East Fork Salmon River stock), of which 3,800 were East Fork Natural B stock. A-run eyed-eggs included 906,282 (Pahsimeroi), and 399,000 (Sawtooth). The grand total of steelhead eggs received this year was 2,518,676. All eggs were received in April, May, and June 2001. The survival of eyed-eggs to smolts is found in Appendix A.

All eggs received were treated with Povidone Iodine at 100-ppm for ten minutes, and put into the upwelling incubators (50,000-75,000 eggs per incubator, 15 gpm). The eggs hatched within five days and emerged from the incubators into the hatchery tanks twelve days after hatching. Each of the 20 hatchery tanks (with a flow of 100-250 gpm) averaged 122,000 feeding fry until they reached 300 fpp or almost two inches long. At that time, fish were transferred to the larger outside raceways. The highest mortality rate occurred during the hatching, swim-up, and early-rearing stages. Survival was comparable in most stocks of eggs. Historically, Dworshak progeny survive at a significantly lower rate than other stocks. Appendix L compares the thirteen-year average of survival from the eyed-egg stage to final release for all stocks cultured at Magic Valley Steelhead Hatchery.

### **Final Production Rearing**

Fish were fed Rangen 440 extruded salmon diet using Haskell's (1967) feeding rate formula. The feeding rate was calculated using a 10.0 hatchery constant. Fish are started on feed as one-inch swim-up fry and hatchery growth ends with an approximate 8.30-inch smolt. The fish had a conversion of 1.13 lbs of feed to produce a lb of fish.

Generally, approximately one inch of growth per month for the first three months is achieved when the fish are fed every day. An intermittent schedule of five days on and two days off feed was implemented in September to insure the fish met target size. The steelhead maintained an average .65 to .75-inch per month growth using this system. This schedule was used through the middle of March, at which time all fish were put on feed seven days a week. See Appendix B for feed and total costs for the year.

Piper's (1970) formulas for density and flow indices were used to calculate the densities and flows for each tank or raceway. The maximum recommended density index of .30 or 1.25 flow index was not reached until the end of March in some raceways. Final pond inventories and indices for the individual raceway numbers, densities, and flows are found in Appendix D.

Maximum flows for the year were approximately 97 cfs from October 2001 through March 2002. The majority of the time flows were recorded around 87 to 95 cfs. Each of the outside 32 raceways had about 2.9 cfs prior to distribution in April.

Steelhead smolt distribution began on April 9, 2002 and continued five days a week through May 7, 2002. An average of five trucks per day was used for the transportation of 461,460 lbs of fish and involved 98 truckloads (Appendix C). This year we continued to haul 5,000 lbs per load to

meet IHOT (Integrated Hatcheries Operation Team) recommendations.

### **Length Frequency Data**

Combined length frequencies were taken from all stocks again this year and are shown in Appendix H.

## **FISH HEALTH**

### **Diseases Encountered and Treatment**

*Flavobacterium psychrophilum*, the etiologic agent of Coldwater Disease (CWD), was the main cause of mortality in the steelhead stocks at this facility. A concomitant infection of Infectious Hematopoietic Necrosis Virus (IHNV) exacerbated mortality. Oxytetracycline medicated feed treatments were applied under the INAD 9332 provisions for the *F. psychrophilum* infection.

**ORGANOSOMATIC INDEX.** See Appendix E.

### **Acute Losses**

Coldwater Disease caused acute losses in steelhead fry in excess of 1500 fish/day. OTC-medicated feed treatments (10g OTC/100 pounds of Biomass treated for 14 days) controlled mortalities at this facility. The IHNV contributed to mortalities and was associated with CWD.

### **Other Assessments**

An egg quality committee was formed to investigate any possible links between hatchery operations at Magic Valley, Dworshak and Clearwater hatcheries. At this time, the committee has not formulated an opinion on why CWD is a perennial problem at Magic Valley Hatchery.

Despite early epizootics, the fish from this facility at preliberation sampling appeared to be healthy fish by all sampling parameters.

### **Precocial Male Observation**

Fishery Research personnel continued a precocial steelhead smolt study on fish released into the Squaw Creek acclimation pond and directly into Squaw Creek. Results indicate a higher occurrence of precocity in non-migrant fish compared to direct release fish. Appendix K shows the results of precocial male steelhead sampled in each group. For more detailed information regarding steelhead smolt precocity, contact the Department's Nampa Research Lab.



## **FISH MARKING**

Normally, all of the A-run and B-run hatchery steelhead are required to have an adipose fin clip distinguishing them from wild steelhead. However, this year was the third year that fish were reared for supplementation releases for the Shoshone–Bannock Tribe. A total of 146,490 Pahsimeroi A-strain steelhead were set-aside in West raceways 12 and 13 to produce 143,363 unmarked fish for release.

At MVH the fin clipping crew Ad-marked 1,958,690 fish during August and September. Fin-clipping mortality was negligible. No treatment was necessary after handling.

Four groups of steelhead were coded-wire-tagged (CWT) in Brood Year 2001. A total of 134,396 fish received CWTs in 2000, of which 130,369 survived and were out-planted as smolts in 2001. See (Appendix F) for CWT details.

In addition, a total of 1,800 smolts had Passive Integrated Transponder (PIT) tags inserted in them. Only seven mortalities were discovered in those fish resulting in 1,793 PIT-tagged fish being released.

## **PHOSPHORUS CHARACTERIZATION STUDY**

In late 1999, the Environmental Protection Agency (EPA) issued new effluent discharge permits for aquaculture facilities in the mid-Snake River area. As part of the permitting process, each fish culture facility was required to participate in an effluent characterization study. The EPA's primary area of concern was the monitoring of phosphorus. Hatchery personnel initially conducted a twelve-month effluent characterization study beginning in January 2000, and ending in December of the same year.

As part of the phosphorus waste load allocation process, personnel from the Magic Valley/Hagerman area conservation fish hatcheries met with Idaho Department of Environmental Quality (IDEQ) personnel in June of 2001 to discuss allocation scenarios. It was the understanding of most of the conservation hatchery personnel that data collected during the initial phosphorus characterization study period (January 2000 to December 2000) were to be used in forming a conservation hatchery waste load allocation. However, during the June 2001 meeting, IDEQ personnel informed us that the period for collecting data for the characterization study could be extended through September of 2002. Therefore, hatchery personnel reinitiated monthly phosphorus monitoring beginning in July 2001 to increase the data set for establishing a phosphorus allocation for Magic Valley Steelhead Hatchery.

Appendix M shows the results of the continuation of the phosphorus characterization study.

The highest phosphorus results recorded occurred predictably during maximum production load. Although phosphorus levels have been monitored annually by either the Idaho Department of Environmental Quality or the EPA, phosphorus levels recorded during inspections continue to yield a wide range of results.

## **MAINTENANCE PROJECTS**

During the year, the following projects were completed:

1. Continued sealing and patching of raceway wall cracks.
2. Installed GFCI outlets and smoke detectors in all four residences kitchens.
3. Installed smoke and heat detectors in the hatchery dormitory including connection to existing alarm system.
4. Repaired and replaced several drive wheels on the traveling feeding bridge.
5. Fabricated 20 aluminum cleaning valve keys for the incubation room and 4 cleaning valve keys for the production raceway Q-Zone valves.
6. Installed two additional fire extinguishers for each residence.
7. Installed 4" mesh bird netting around the entire production raceways.
8. Purchased replacement stainless steel plumbing fittings for inside the incubation building.
9. Repaired the electrical drive motor and replaced the variable frequency drive to the traveling feeding bridge.
10. Installed domestic water faucets and hot water line into the incubation building.
11. Completed incubation packed column replacements.
12. Replaced sliding glass door in residence two.
13. Replaced electric winch on the fish pump intake crane.
14. Replaced 8" fish pump hydraulic motor.
15. Painted the decks of all four residences.
16. Replaced all carpets in residence one due to carpet beetle infestation.
17. Installed a donated stainless steel utility tub/sink in the incubation room.
18. Surveyed for a fire safety access road behind residences one and two.

## **LITERATURE CITED**

Haskell, D.C. 1967. Calculations of amounts to feed trout in hatcheries. *Progressive Fish Culturist* 19 (4).

Piper, R.G. 1970a. Know the proper carrying capacities of your farm. *American Fishes and U.S. Trout News* 15 (1):

Munson, Doug 2002. Preliberation autopsy report.

## **APPENDICES**

## Appendix A. Brood Year 2001 Steelhead Survival Rates.

	DWORSHAK "B"	EAST FORK "B"***	PAHSIMEROI "A"	SAWTOOTH "A"	GRAND TOTAL
EGGS	1,131,772	81,622	906,282	399,000	2,518,676
% HATCHED	87%	97%	99%	99%	96%
SMOLTS STOCKED	646,739	63,156	860,824	328,811	1,899,530
WEIGHT SMOLTS	153,300	15,060	212,491	80,609	461,460
NO./LB.	4.2	4.2	4.1	4.1	4.1
% SURVIVAL					
EGG/RELEASE	57%	77%	95%	82%	75%
POUNDS OF FOOD	180,391	16,578	228,051	94,822	519,982
CONVERSION	1.18	1.10	1.07	1.18	1.13

\*\*\* Includes 3,800 East Fork Natural B's

## Appendix B. Brood Year 2001 Production Feed Cost And Utilization.

Number Of Fish	1,899,530
Lbs Of Fish	461,460
Feed Cost	\$168,206.42
Lbs Of Feed	519,982
Conversion	1.13
Total Cost	\$542,363.00
Cost Per 1000 Fish	\$285.52
Cost Per Pound Fish	\$0.3645

Appendix C. Brood Year 2001 Steelhead Smolt Distribution in the Salmon River and Tributaries.

Date	Destination	Number	Stock	Fish/lb.	Pounds
4/12/2002	Little Salmon R (Stinky Springs)	54,000	A	4.5	12,000
4/8-4/9/2002	Little Salmon R (Stinky Springs)	104,750	B	4.3	24,250
4/8/2002	Squaw Creek Acclimation Pond (acclimated fish)	94,440	B	4.8	19,700
4/25-5/1/2002	Squaw Creek DWOR B (direct release into Squaw Creek)	230,178	B	4.1	55,850
4/24-4/25/2002	Squaw Creek E.F.B	59,356	B	4.2	14,200
4/29-5/1/2002	East Fork Salmon River (lower)	217,371	B	4.1	53,500
5/1/2002	East Fork Salmon River (above E. Fk. Weir)	3,800	A	4.4	860
5/3-5/7/2002	Lemhi River	115,223	A	3.8	30,600
5/3-5/7/2002	Lemhi River (no clip)	143,363	A	3.9	36,800
5/2/2002	Yankee Fork	99,738	A	3.9	25,800
4/10-4/12/2002	Hammer Cr	179,558	A	3.9	46,200
4/19/2002	(Red Rock)	40,265	A	4.0	10,000
4/15/2002	(Lewis and Clark)	43,000	A	4.3	10,000
4/15/2002	(Wagonhammer)	44,770	A	4.5	10,000
4/18/2002	(Shoup Bridge)	63,000	A	4.5	14,000
4/19-4/22/2002	(Eye Hole)	41,350	A	4.1	10,000
4/12/2002	(Colston Corner)	41,350	A	4.1	10,000
4/18-4/19/2002	(Lemhi Hole)	84,608	A	4.2	20,000
4/22/4/23/2002	(Tunnel Rock)	49,800	A	4.2	12,000
4/23/2002	(McNabb Point)	70,590	A	3.9	18,100
4/22/2002	(Cottonwood)	61,420	A	4.2	14,800
4/24/2002	(Challis Ramp)	57,600	A	4.5	12,800
	<b>Totals</b>	<b>1,899,530</b>		<b>4.12</b>	<b>461,460</b>



## Appendix D. Brood Year 2001 Final Raceway Inventory with Flow and Density Indices.

Raceway	Stock	Number	Weight	No/lb	Length	Flow Index	Density Index
E1	DWOR B	50,440	9,700	5.2	7.93	0.91	0.23
E2	DWOR B	62,040	14,100	4.4	8.39	1.25	0.31
E3	DWOR B	45,760	10,400	4.4	8.39	0.92	0.23
E4	DWOR B	40,950	9,750	4.2	8.52	0.85	0.21
E5	DWOR B	37,469	8,900	4.2	8.51	0.77	0.19
E6	DWOR B	64,680	15,400	4.2	8.52	1.34	0.34
E7	DWOR B	63,118	15,100	4.2	8.52	1.31	0.33
E8	DWOR B	52,593	14,100	3.7	8.89	1.18	0.30
E9	DWOR B	58,240	14,000	4.2	8.52	1.22	0.31
E10	DWOR B	56,200	14,050	4.0	8.66	1.20	0.30
E11	DWOR B	56,170	13,700	4.1	8.59	1.18	0.30
E12	DWOR B	59,079	14,100	4.2	8.52	1.23	0.31
E13	EFK B	63,156	15,060	4.2	8.52	1.31	0.33
E14	SAW A	57,600	12,800	4.5	8.33	1.14	0.29
E15	SAW/PAH	70,590	18,100	3.9	8.73	1.54	0.39
E16	SAW/PAH	70,550	17,000	4.2	8.52	1.48	0.37
W1	PAH A	58,178	15,400	3.8	8.81	1.29	0.33
W2	PAH A	64,080	17,800	3.6	8.97	1.47	0.37
W3	PAH A	52,800	12,000	4.4	8.39	1.06	0.27
W4	PAH A	70,650	15,700	4.5	8.33	1.40	0.35
W5	PAH A	56,340	13,200	4.3	8.45	1.16	0.29
W6	PAH A	60,630	14,100	4.3	8.45	1.24	0.31
W7	PAH A	63,000	14,000	4.5	8.33	1.25	0.31
W8	PAH A	65,360	15,200	4.3	8.45	1.33	0.33
W9	PAH A	53,333	13,300	4.0	8.66	1.14	0.29
W10	PAH A	58,900	15,500	3.8	8.81	1.30	0.33
W11	PAH A	56,323	15,100	3.7	8.89	1.26	0.32
W12	PAH A	73,125	19,500	3.8	8.81	1.64	0.41
W13	PAH A	70,238	17,300	4.1	8.59	1.49	0.38
W14	SAW A	62,400	16,000	3.9	8.73	1.36	0.34
W15	SAW A	64,118	16,300	4.1	8.59	1.41	0.35
W16	SAW A	61,420	14,800	4.2	8.52	1.29	0.32



<b>Total</b>		<b>1,899,530</b>	<b>461,460</b>	<b>4.1</b>	<b>8.58</b>	<b>1.25</b>	<b>0.31</b>
--------------	--	------------------	----------------	------------	-------------	-------------	-------------

## Appendix E. Brood Year 2001 Organosomatic Index Expressed in Percent of Normals

Date	Stock	Eyes	Gills	Pseudo-Branch	Thymus	Mesentery Fat	Spleen	Hind Gut	Kidney	Liver
3/21/2002	Saw A	100	100	100	100	100	100	100	100	100
3/21/2002	Pah A	100	100	100	100	100	100	100	100	100
3/21/2002	EFK.	100	100	100	100	100	100	100	100	100
3/21/2002	Dwor. B	100	100	100	100	100	100	100	100	100

## Appendix F. Brood Year 2001 Coded-Wire and PIT Tag Releases

CWT Code	Stock	Number CWT	Number Stocked	PIT Tag	Site & Purpose	Raceway Number
10-68-70	PAH A	22,326			Lemhi ST Chrls	11 West
10-12-72	PAH A	11,442	33,156	299	Lemhi ST Chrls	11 West
NONE	PAH A	0	0	295	Lemhi ST Chrls	13 West
NONE	SAW A	0	0	300	Yankee Fork	15 West
10-93-71	DWOR B	33,426	32,493	300	Squaw Creek	12 East
10-66-70	EFK B	22,283				13 East
10-10-72	EFK B	10,786	31,270	299	Squaw Creek	13 East
10-67-70	SAW A	22,623			Challis Ramp	14 East
10-11-72	SAW A	11,510	33,450	NONE	Challis Ramp	14 East
NONE	SAW/PAH	0	0	300	Tunnel Rock	16 East
<b>Total</b>		<b>134,396</b>	<b>130,369</b>	<b>1,793</b>		

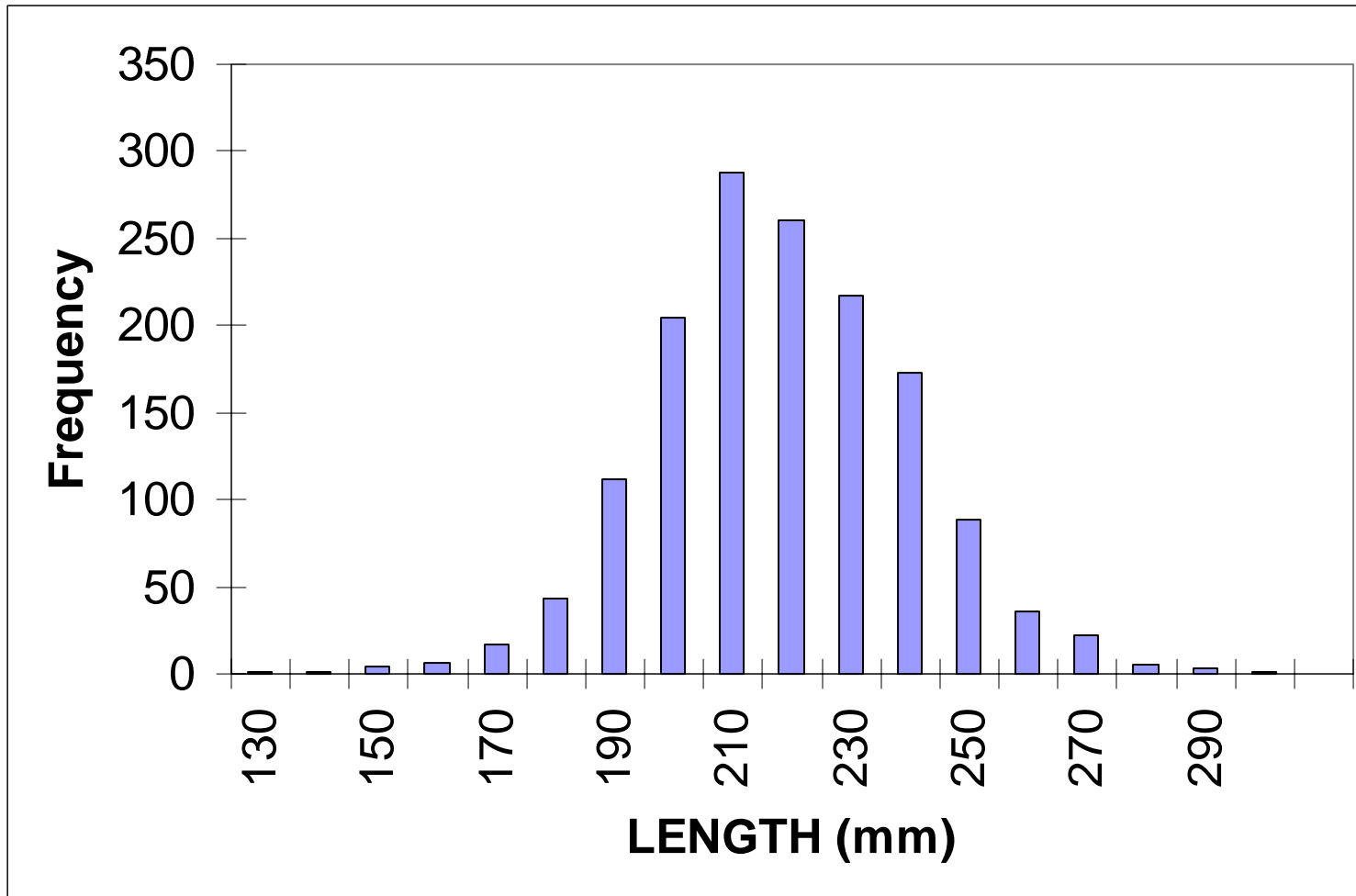
## Appendix G. Historic Release Data

Year	Combined A-run Eggs	East Fork B-run Eggs	Dworshak B-run Eggs	Total Eggs	Spring/Smolt Releases	Fall/Fry Releases	Total Fish Released	Fish /Lb.	Lbs Released	Lbs Feed	Food Conv
1982-83				145,206	135,361		135,361	4.23	32,000	57,700	2.24
1983-84	238,000		68,000		264,574		264,574	2.77	95,430	154,120	1.62
1984-85				NONE	231,991		231,991	4.37	52,990	HNFH	
1985-86				NONE	NONE				-		
1986-87				NONE	264,415		264,415	4.39	60,215	HNFH	
1987-88		FRY		2,109,780	2,064,661		2,064,661	4.54	454,500	554,000	1.32
1988-89	2,047,748	357,506		2,405,254	2,202,800		2,202,800	4.32	509,100	703,373	1.38
1989-90	1,306,674	333,537	1,212,066	2,852,277	2,285,800		2,285,800	4.67	489,430	687,077	1.40
1990-91	1,269,000	463,730	900,000	2,632,730	2,062,000		2,062,000	4.11	501,100	662,326	1.32
1991-92	1,127,928	91,317	1,207,699	2,426,944	2,160,400		2,160,400	4.21	513,000	624,573	1.22
1992-93	1,031,274	133,826	1,322,740	2,487,840	1,925,700		1,925,700	5.75	334,500	529,936	1.58
1993-94	1,081,500	179,080	1,507,033	2,767,613	1,919,250	392,300	2,311,550	4.73	405,450	654,693	1.61
1994-95	800,785	75,395	1,520,160	2,396,340	1,731,355	26,531	1,757,886	4.41	391,825	548,400	1.49
1995-96	803,000	40,000	1,502,200	2,345,200	1,868,085		1,868,085	4.63	402,926	453,662	1.13
1996-97	947,796	139,400	940,391	2,027,587	1,643,210		1,643,210	4.50	364,775	380,647	1.03
1997-98	855,000	356,340	1,403,900	2,615,240	1,658,825		1,658,825	4.47	370,900	419,222	1.14
1998-99	1,010,540	7,700	1,287,712	2,305,952	1,962,624	106,950	2,069,574	4.12	471,608	574,392	1.20
1999-00	1,052,109	57,954	1,340,756	2,450,819	2,050,039	111,820	2,164,859	4.22	490,850	589,434	1.20
2000-01	1,937,984	51,384	544,006	2,533,374	2,022,017		2,022,017	4.63	436,150	509,927	1.17
2001-02	1,305,282	81,622	1,131,772	2,518,676	1,899,530		1,899,530	4.12	461,460	519,982	1.13

Appendix H. Brood Year 2001 Length Frequency Graph

MVBY01REPORT

15

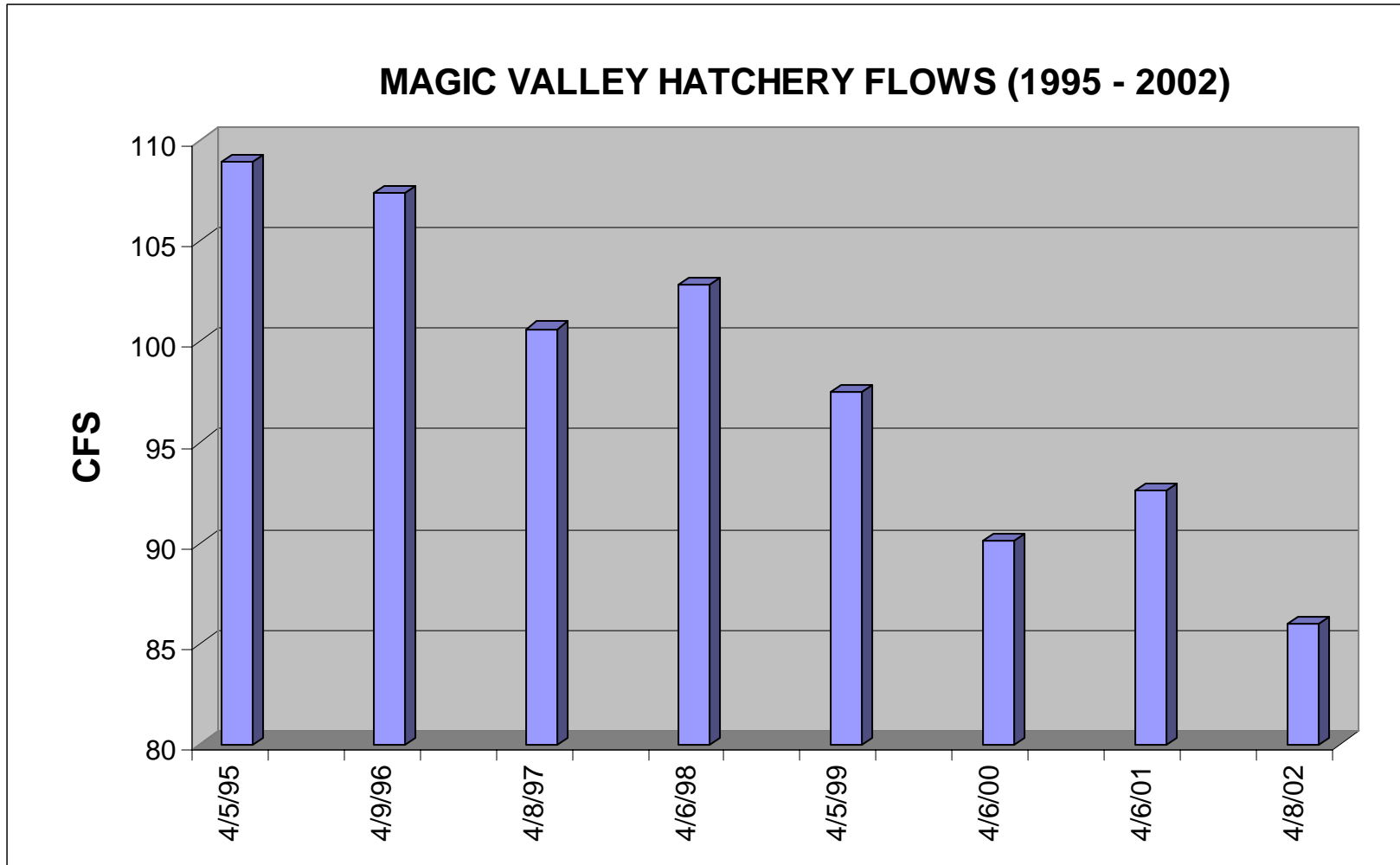


Appendix I. Hayspur Rainbow and Kamloop Trout started for Hagerman State Hatchery

Hayspur Eggs Received @ Magic Valley Hatchery

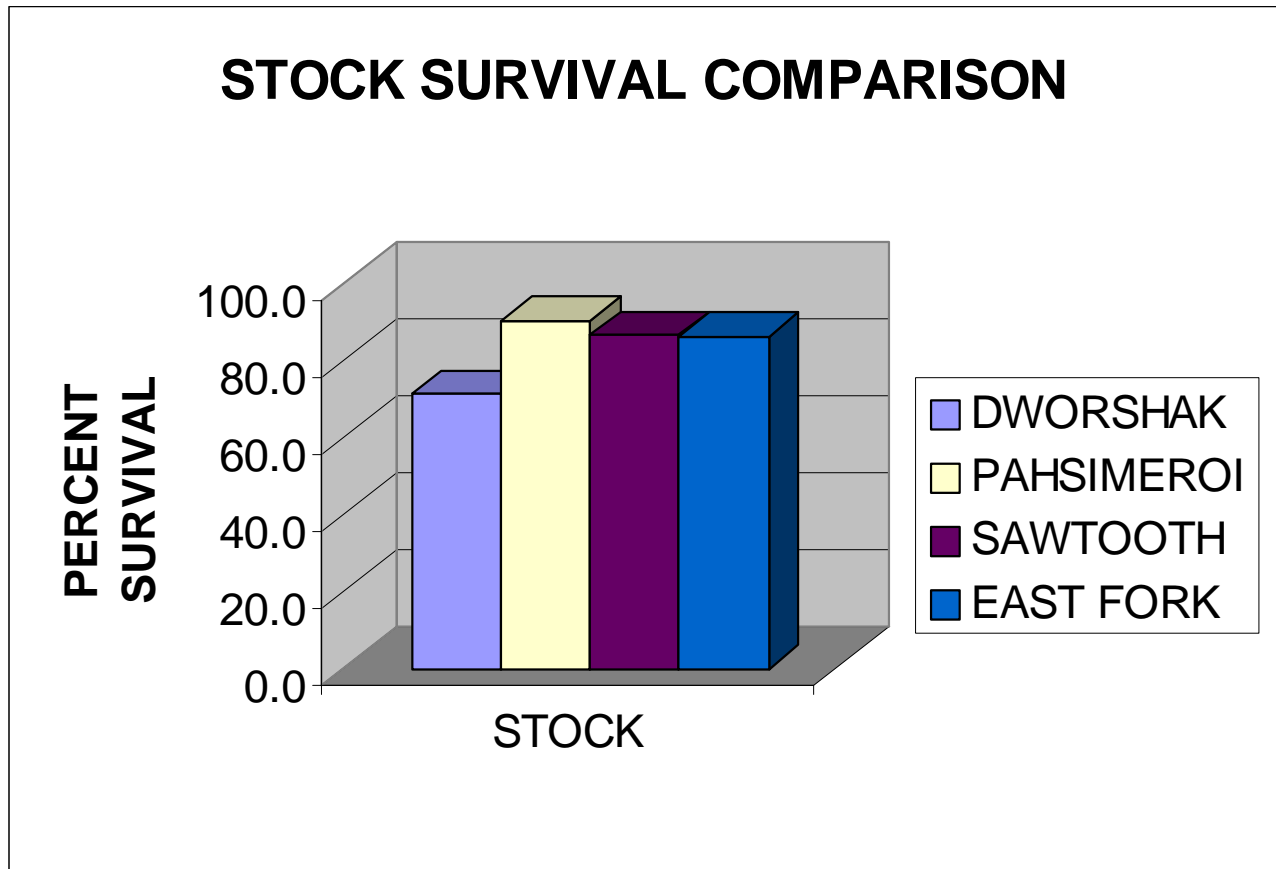
2001- 2002				Moved to Hagerman			Percent Survival	
Date	Vat #	Egg #	Stock	Date	Pounds	#/lb	Number	Eggs
11/26/2001	11	129,372	KT-18	2/11/02	520	161	83,720	65%
11/26/2001	12	132,258	KT-18	2/12/02	570	157	89,490	68%
11/26/2001	13	126,300	KT-20	2/13/02	570	142	80,940	64%
11/26/2001	14	117,300	KT-20	2/14/02	430	159	68,370	58%
11/26/2001	15	72,900	KT-23	2/15/02	330	127	41,910	57%
12/3/2001	16	128,215	T9-11/10	2/19/02	595	158	94,010	73%
12/3/2001	17	140,299	T9-10/13	2/19/02	615	143	87,945	63%
12/3/2001	18	144,295	T9-13	2/19/02	560	144	80,640	56%
12/3/2001	19	111,443	T9-12	2/19/02	530	146	77,380	69%
12/10/2001	20	126,907	KT-24	2/19/02	550	143	78,650	62%
<b>TOTAL</b>		<b>1,229,289</b>			<b>5,270</b>	<b>148</b>	<b>783,055</b>	<b>64%</b>

Appendix J. Hatchery Water Flows 1995-2002



Appendix K. Brood Year 2001 Precocial Male Sampling Results

<b>Group</b>	<b>% Precocity (Males)</b>	<b>Sample Size</b>	<b>Date of Sample</b>
Direct Release	1.03	97	4/25/02
Non-Migrant	7.69	104	5/16/02





Appendix M. Phosphorus Characterization Study (2001-2002)

		<b>PRODUCTION</b>	<b>Net TP</b>	<b>Net TP</b>
<b>DATE</b>	<b>FLOW</b>	<b>(lbs)</b>	<b>(mg/L)</b>	<b>(lbs/day)</b>
Jul-01	19.7	5,638	0.021	2.23
Aug-01	55.6	13,876	0.015	4.50
Sep-01	96.0	30,051	0.006	3.11
Oct-01	97.1	51,958	0.006	3.15
Nov-01	92.1	79,169	0.013	6.47
Dec-01	92.1	122,795	0.022	10.94
Jan-02	89.7	183,632	0.025	12.10
Feb-02	89.7	243,571	0.030	14.50
Mar-02	87.2	322,216	0.045	21.20
Apr-02	87.2	387,874	0.046	21.70
May-02	4.50	461,460	0.036	0.87
Jun-02	34.3	2,018	0.080	14.80
Jul-02	53.3	7,614	0.012	3.50
Aug-02	66.3	21,289	0.007	2.50
Sep-02	87.2	47,059	0.011	5.18
			<b>AVERAGE:</b>	<b>13.84</b>

**Submitted by:**

Rick Lowell  
Fish Hatchery Manager II

Dave May  
Assistant Fish Hatchery Manager

Wade Symons  
Fish Culturist

Jeff Heindel  
Fish Culturist

**Approved by:**

---

Virgil Moore, Chief  
Bureau of Fisheries

---

Tom Rogers  
Fish Hatcheries Supervisor